REMARKS

The Examiner's Action mailed on August 23, 2005 has been received and its contents carefully considered. Claims 1, 10, and 15 have been amended. New claims 24-29 have been added. Claims 1-29 are now pending in the application. The specification also is amended to overcome the specific objections set forth by the Examiner. No new matter is introduced by any of these amendments. For at least the following reasons, it is submitted that this application is in condition for allowance.

Claims 1-23 are rejected under 35 U.S.C. 102(a) as being anticipated by *Okuzono* (US Patent 6,727,874). Claim 1 has been amended for improved clarity, and it is submitted that amended claim 1 clearly is patentable over *Okuzono* for at least the following reasons.

Applicant's amended independent claim 1 recites:

> A gamma correction apparatus for outputting a corresponding pixel voltage according to a pixel signal for a liquid crystal display (LCD), wherein the LCD has a plurality of pixels used to display a plurality of colors, the gamma correction apparatus comprising:
>
> a gray-scale voltage generating circuit, which comprises:
>
> a common gray-scale voltage generating circuit for generating a plurality of common gray-scale voltages; and
>
> a plurality of individual gray-scale voltage generating circuits, coupled to the common gray-scale voltage generating circuit, wherein each of the individual gray-scale voltage generating circuits generates a plurality of individual gray-scale voltages corresponding to one of the colors, and the values of the individual gray-scale voltages generated by each individual gray-scale voltage generating circuit are determined according to what color the individual gray-scale voltage generating circuit corresponds to; and

a gamma correction circuit, coupled to the common gray-scale voltage generating circuit and the individual gray-scale voltage generating circuits, wherein according to a corresponding color of the pixel signal, the gamma correction circuit generates the corresponding pixel voltage based on the common gray-scale voltages and the corresponding individual gray-scale voltages of the corresponding color.

Okuzono recites:

"The gray scale voltage supplying source 29 is provided with 255 individual resistors 31_1 to 31_{255} each having **the same resistance value** and being connected serially between a terminal of the reference voltage V_{REF} and a terminal of a ground and feeds 256 individual gray scale voltages V_0 (=V_{REF} /255x0=0[V]) to V_{255} (=V_{REF} /255x255=V_{REF} [V]) to the MPX 30. The MPX 30 **selects any one** of the 256 gray scale voltages V_0 to V_{255} fed from the gray scale voltage supplying source 29 based on the 8 bits of the selection signals D Ch R0 to D Ch R17, D Ch G0 to D Ch G17, and D Ch B0 to D Ch B17 fed from the gray scale voltage information storing section 28 and outputs it as one of analog red gray scale voltages V_{R0} to V_{R17}, or one of analog green gray scale voltages V_{G0} to V_{G17}, or one of analog blue gray scale voltages V_{B0} to V_{B17}." (emphasis added; see *Okuzono*'s col. 12, line 60 to col. 13, line 7, and Fig. 5)

Okuzono recites:

"The data signal output circuit 25 shown in FIG. 4 is made up of three data signal output sections 25_R, 25_G, and 25_B corresponding to each of the red data D_R, green data D_G, and blue data D_B. Since all of the data signal output sections 25_R, 25_G, and 25_B have the same configurations except that each of their components and each of input and output signals have a different subscript, a description of only the data signal output section 25_R (FIG. 6) will be provided below.

The data signal output section 25_R, as shown in FIG. 6, is made up of a gray scale voltage splitting section 32_R and an MPX 33_R. The gray scale voltage splitting section 32_R is provided with 255 pieces of resistors 34_1 to 34_{255} each having a **different resistance value** and being connected serially, and **splits the red gray scale voltages** V_{R0} to V_{R17} fed from the voltage followers 24_1 to 24_{18} **into 256 pieces of the red gray scale voltages** V_{GR0} to V_{GR255} and feeds them to the MPX 33_R. The MPX 33_R makes the gamma correction to the 8 bits of the red data D_R fed from the control circuit 21 to provide gray scales, **based on** a set of the red gray scale voltages V_{GR0} to V_{GR127} or a set of the red gray scale voltages V_{GR128} to V_{GR255} switched by the polarity reversed pulse POL fed from the control circuit 21 out of 256 pieces of the red gray scale voltages V_{GR0} to V_{GR255} fed from the gray scale voltage splitting section 32_R and, at the same time, converts the gamma-corrected data to the analog data red signals S_1, S_4, S_7, . . . , S_{382}, and then feeds the converted signals to the voltage followers 26_1, 26_4, 26_7, . . . , 26_{382}."

(emphasis added; see *Okuzono*'s col. 13, lines 39 to 65, and Figs. 4 and 6)

In brief, firstly *Okuzono*'s MPX 30 **selects any one** of the 256 gray scale voltages V_0 to V_{255} fed from the gray scale voltage supplying source 29 based on the 8 bits of the selection signals D Ch R0 to D Ch R17, D Ch G0 to D Ch G17, and D Ch B0 to D Ch B17 and outputs VR0 to VR17, VG0 to VG17, and VB0 to VB17. Then, the gray scale voltage splitting section 32_R **splits the red gray scale voltages** V_{R0} to V_{R17} **into 256 red gray scale voltages** V_{GR0} to V_{GR255} and feeds them to the MPX 33_R (take "R" for example). After that, the MPX 33_R makes the gamma correction to the 8 bits of

the red data D_R to provide gray scales, **based on** a set of the red gray scale voltages V_{GR0} to V_{GR127} or a set of the red gray scale voltages V_{GR128} to V_{GR255}.

The Examiner views *Okuzono*'s the gray scale voltage supplying source 29, the gray scale voltage splitting sections 32_R, and MPX 33_R as, respectively, the common gray-scale voltages generating circuit, the individual gray-scale voltage generating circuits, and the gamma correction circuit defined in claim 1. *Okuzono*'s MPX 33_R is coupled only to the gray scale voltage splitting sections 32_R, and not coupled to the gray scale voltage supplying source 29. The MPX 33_R makes the gamma correction to the 8 bits of the red data D_R **based only on** a set of the red gray scale voltages V_{GR0} to V_{GR127} or a set of the red gray scale voltages V_{GR128} to V_{GR255}.

However, *Okuzono* discloses neither "a gamma correction circuit, coupled to the common gray-scale voltage generating circuit and the individual gray-scale voltage generating circuits", nor that "the gamma correction circuit generates the corresponding pixel voltage based on the common gray-scale voltages and the corresponding individual gray-scale voltages of the corresponding color," as recited in amended claim 1.

Therefore, amended claim 1 is not anticipated by or obvious from *Okuzono*. Amended claim 1 therefore clearly is patentable over *Okuzono*.

Moreover, *Okuzono* discloses neither that "the corresponding pixel voltage is substantially equal to one of the common gray-scale voltages and the corresponding individual gray-scale voltages" as recited in added claim 24, nor that "the common gray-

scale voltage generating circuit comprises a series of resistors with a plurality of nodes, each individual gray-scale voltage generating circuit comprises a series of resistors, one end of the series of resistor of the respective individual gray-scale voltage generating circuits are connected together, and the connected ends of the series of resistors of the individual gray-scale voltage generating circuits are further connected to one node of the series of resistors of the common gray-scale voltage generating circuit," as recited in new claim 25.

Claims 2-9, 24, and 25 depend from claim 1, and therefore are patentable also for the reasons advanced above as to the patentability of claim 1.

Claim 10 is rejected under 35 U.S.C. 102(a) as being anticipated by *Okuzono*. Claim 10 has been amended for improved clarity, and it is submitted that amended claim 10 clearly is patentable over *Okuzono* for at least the following reasons.

Applicant's amended independent claim 10 recites:

> A gamma correction apparatus for outputting a corresponding pixel voltage according to a pixel signal for a liquid crystal display (LCD), wherein the LCD has a plurality of pixels used to display the colors red, green, and blue, the gamma correction apparatus comprising:
>
> a gray-scale voltage generating circuit, comprising:
>
> a common gray-scale voltage generating circuit for generating a plurality of common gray-scale voltages;
>
> a red individual gray-scale voltage generating circuit coupled to the common gray-scale voltage generating circuit for generating a plurality of red gray-scale voltages;
>
> a green individual gray-scale voltage generating circuit coupled to the common gray-scale voltage generating circuit for generating a plurality of green gray-scale voltages; and

a blue individual gray-scale voltage generating circuit coupled to the common gray-scale voltage generating circuit for generating a plurality of blue gray-scale voltages; and

a gamma correction circuit coupled to the common gray-scale voltage generating circuit and the red, green, and blue individual gray-scale voltage generating circuits;

wherein the gamma correction circuit outputs the pixel voltage corresponding to the pixel signal based on:

the common gray-scale voltages and the red gray-scale voltages when the pixel signal is used to display the color red;

the common gray-scale voltages and the green gray-scale voltages when the pixel signal is used to display the color green; and

the common gray-scale voltages and the blue gray-scale voltages when the pixel signal is used to display the color blue.

The Examiner views *Okuzono*'s the gray scale voltage supplying source 29, the gray scale voltage splitting sections 32_R, the gray scale voltage splitting sections 32_G, the gray scale voltage splitting sections 32_B, and data signal output section 25_R as, respectively, the common gray-scale voltages generating circuit, the red gray-scale voltage generating circuits, the green gray-scale voltage generating circuit, the blue gray-scale voltage generating circuit, and the gamma correction circuit defined in applicant's claim 10. *Okuzono*'s data signal output section 25_R is not coupled to the gray scale voltage supplying source 29. The data signal output section 25_R makes the gamma correction to the 8 bits of the red data D_R **based only on** a set of the red gray scale voltages V_{GR0} to V_{GR127} or a set of the red gray scale voltages V_{GR128} to V_{GR255}.

However, *Okuzono* discloses neither, "a gamma correction circuit coupled to the common gray-scale voltage generating circuit and the red, green, and blue individual

gray-scale voltage generating circuits", nor that "the gamma correction circuit outputs the pixel voltage corresponding to the pixel signal based on: the common gray-scale voltages and the red gray-scale voltages when the pixel signal is used to display the color red; the common gray-scale voltages and the green gray-scale voltages when the pixel signal is used to display the color green; and the common gray-scale voltages and the blue gray-scale voltages when the pixel signal is used to display the color blue," as recited in amended claim 10.

Therefore, amended claim 10 is not anticipated by or obvious from *Okuzono*. Amended claim 10 therefore clearly is patentable over *Okuzono*.

Moreover, *Okuzono* disclose neither that "the pixel voltage is substantially equal to one of the common gray-scale voltages and the red individual gray-scale voltages when the pixel signal is used to display the color red, the pixel voltage is substantially equal to one of the common gray-scale voltages and the green individual gray-scale voltages when the pixel signal is used to display the color green; and the pixel voltage is substantially equal to one of the common gray-scale voltages and the blue individual gray-scale voltages when the pixel signal is used to display the color blue," as recited in added claim 26, nor that "the common gray-scale voltage generating circuit comprises a series of resistors with a plurality of nodes, each of the red, green, and blue gray-scale voltage generating circuits comprises a series of resistors, one end of the respective series of resistors of the red, green, and blue gray-scale voltage generating circuits are connected together and the connected ends of the series of resistors of the red, green,

and blue gray-scale voltage generating circuits are further connected to one node of the series of resistors of the common gray-scale voltage generating circuit" as recited in new claim 27.

Moreover, claims 11-14, 26, and 27 depend from claim 10, and therefore also are patentable for the reasons advanced above as to the patentability of claim 10.

Claim 15 is rejected under 35 U.S.C. 102(a) as being anticipated by *Okuzono*. Claim 15 has been amended for improved clarity, and it is submitted that amended claim 15 clearly is patentable over *Okuzono* for at least the following reasons.

Amended independent claim 15 recites:

> A liquid crystal display (LCD), comprising:
> a plurality of pixels for displaying a plurality of colors; and
> a gamma correction apparatus, which outputs a corresponding pixel voltage according to a pixel signal, comprising:
> a gray-scale voltage generating circuit, comprising:
> a common gray-scale voltage generating circuit for generating a plurality of common gray-scale voltages; and
> a plurality of individual gray-scale voltage generating circuits, coupled to the common gray-scale voltage generating circuit, wherein each of the individual gray-scale voltage generating circuits generates a plurality of individual gray-scale voltages, each individual gray-scale voltage generating circuit corresponds to one of the colors, and the values of the individual gray-scale voltages generating from each individual gray-scale voltage generating circuit is determined according to what color the individual gray-scale voltage generating circuit corresponds to; and
> a gamma correction circuit, coupled to the common gray-scale voltage generating circuit and the individual gray-scale voltage generating circuits, wherein according to a color

corresponding to the pixel signal, the gamma correction circuit generates the corresponding pixel voltage based on the common gray-scale voltages and the corresponding individual gray-scale voltages of the corresponding color.

The Examiner views *Okuzono*'s the gray scale voltage supplying source 29, data signal output sections 25_R, 25_G, and 25_B, and MPX 33_R as, respectively, the common gray-scale voltages generating circuit, the individual gray-scale voltage generating circuits, and the gamma correction circuit defined in claim 15. *Okuzono*'s MPX 33_R is not coupled to the gray scale voltage supplying source 29. The MPX 33_R makes the gamma correction to the 8 bits of the red data D_R **based only on** a set of the red gray scale voltages V_{GR0} to V_{GR127} or a set of the red gray scale voltages V_{GR128} to V_{GR255}.

However, *Okuzono* discloses neither, "a gamma correction circuit, coupled to the common gray-scale voltage generating circuit and the individual gray-scale voltage generating circuits", nor that "the gamma correction circuit generates the corresponding pixel voltage based on the common gray-scale voltages and the corresponding individual gray-scale voltages of the corresponding color," as recited in the amended claim 15.

Therefore, amended claim 15 is not anticipated by or obvious from *Okuzono*. Amended claim 15 therefore clearly is patentable over *Okuzono*.

Moreover, *Okuzono* disclose neither that "the corresponding pixel voltage is substantially equal to one of the common gray-scale voltages and the corresponding individual gray-scale voltages" as recited in added claim 28, nor that "the common gray-

scale voltage generating circuit comprises a series of resistors with a plurality of nodes, each individual gray-scale voltage generating circuit comprises a series of resistors, one end of the series of resistors of the respective individual gray-scale voltage generating circuits are connected together, and the connected ends of the series of resistors of the individual gray-scale voltage generating circuits are further connected to one node of the series of resistors of the common gray-scale voltage generating circuit" as recited in new claim 29.

Claims 16-23, 28, and 29 depend from claim 15, and therefore are patentable also for the reasons advanced above as to the patentability of claim 15.

Based on the above, it is submitted that the application is in condition for allowance, and such a Notice, with allowed claims 1-29, earnestly is solicited.

If the Examiner believes that a conference would be of value in expediting the prosecution of this application, the Examiner is hereby invited to telephone the undersigned counsel to arrange for such a conference.

Should any fee be required, please charge the same to our Deposit Account No. 18-0002 and advise us accordingly.

Respectfully submitted,

November 23, 2005
Date

Steven M. Rabin - Reg. No. 29,102
RABIN & BERDO, P.C.
Telephone: (202) 371-8976
Telefax: (202) 408-0924
CUSTOMER NO. 23995

SMR/pjl